SONY CCU-M3P

MODEL

USER'S MANUAL

SECTION 1
GENERAL DESCRIPTION

1-1. FEATURES

Compact size and light weight
The unit is compact and lightweight for maximum handling ease when using the video camera outdoors. All the operation and adjustment functions are housed in a single cabinet.

AC/DC 2-way power operation
The unit can be powered by ac power when the CMA-7CE camera adaptor (optional) is used, and also by the BP-60 battery pack (optional).

Total remote control
The unit allows you to remotely control the camera: the automatic/manual white and black balance, automatic/manual lens iris, output level adjustment, centering adjustment and pedestal level adjustment.

Gen lock
Gen lock with external signals is possible by connecting VBS or black burst signals to the GEN LOCK IN connector. The difference between the horizontal phases and subcarrier phases of the gen-lock reference signal and the output signal can be adjusted.

R, B, G outputs
Besides VBS and VBS/VB selectable outputs, R, B and G video signals are output for a chroma keyer or a RGB video monitor.

Built-in cable compensator
This unit automatically compensates for the loss caused by camera cable extensions up to 100m (when using the CMA-7CE camera adaptor or when the camera and this unit are powered by their own power sources).

Return video
The video signal from a connected VTR, special-effects generator, etc. can be monitored on the camera viewfinder screen.

Tally/intercom
Communication among the operator of this unit, the camera operator and the operator of the control console is possible.

Rack mounting
It is possible to mount the CCU-M3P/PM, a DXF-40CE viewfinder and a CMA-7CE camera adaptor into a 19-inch standard rack.

1-2. PRECAUTIONS

On safety
- Operate the unit only on 12 V dc. For ac operation, use the CMA-7CE camera adaptor (optional) only. Do not use any other equipment.
For battery operation, use the BP-60 battery pack only. Do not use any other battery pack.
- Should any solid object or liquid fall into the cabinet, turn off the unit and have it checked by qualified personnel before operating it any further.

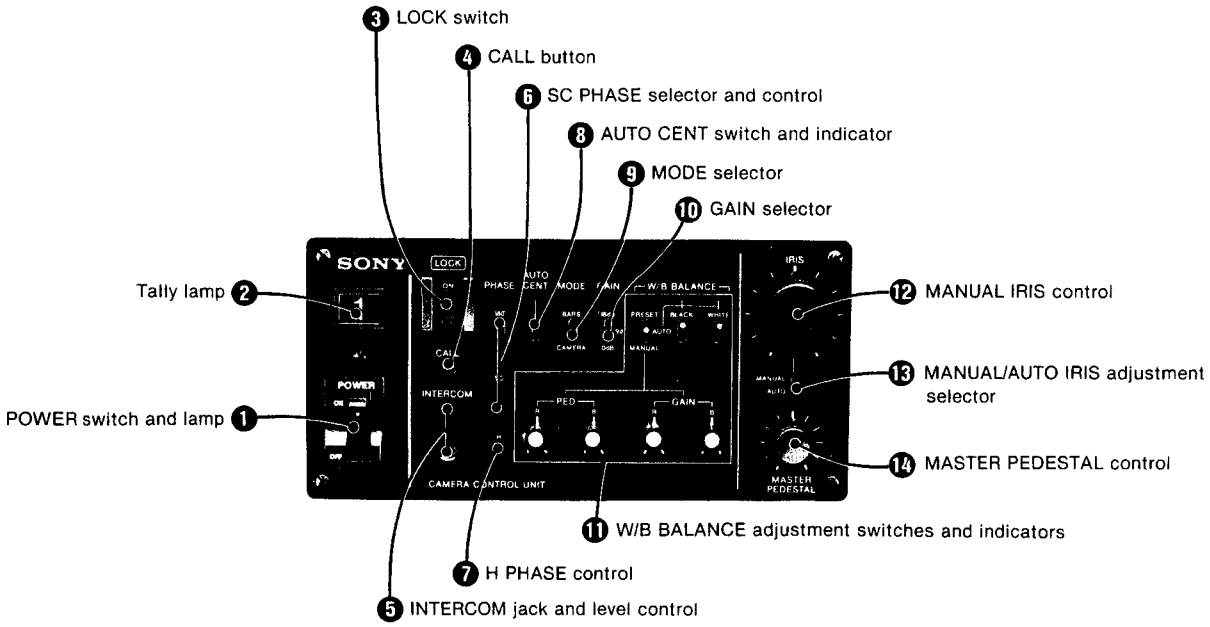
On installation
- Do not install the unit near heat sources such as radiators or air ducts or in a place subject to direct sunlight, excessive dust, mechanical vibration or shock.
- Keep the unit away from equipment with strong magnets, such as speakers.

On cleaning
Clean the cabinet, panel and controls with a dry soft cloth, or a soft cloth lightly moistened with a mild detergent solution. Do not use any type of solvent, such as alcohol or benzine, which might damage the finish.

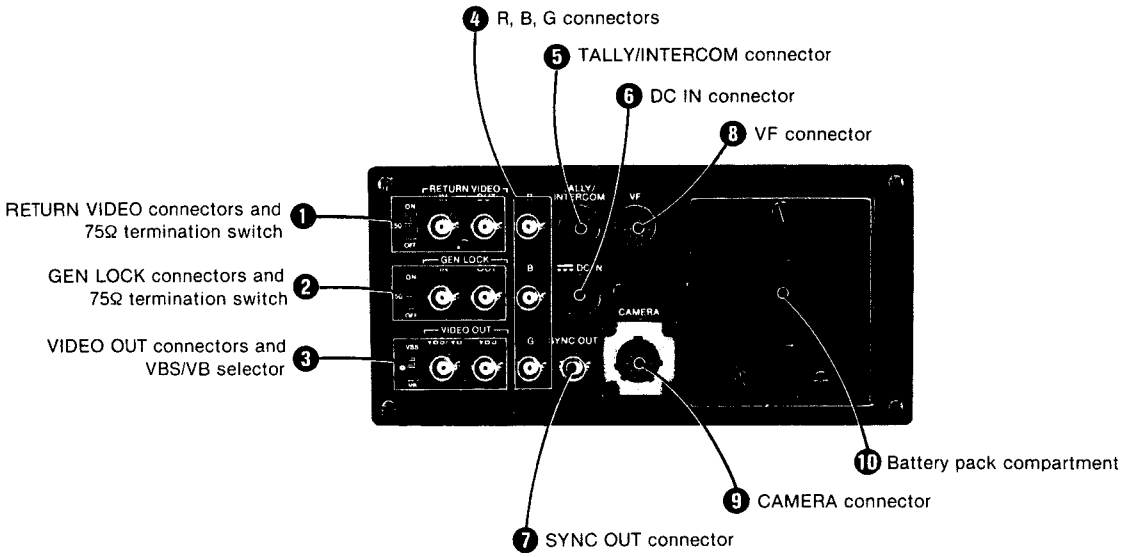
On repacking
Do not throw away the carton and packing materials. They make an ideal container in which to transport the unit. When shipping the unit to another location, repack it as illustrated on the carton.

1-3. LOCATION OF PARTS AND CONTROLS

Control panel



Connector panel



CONTROL PANEL

❶ POWER switch and lamp
Press the ON side of this switch to turn on the power to this unit. The pilot lamp will light, indicating that the power is on. This lamp blinks to warn that the battery connected to the CCU-M3P/PM is nearly discharged.

❷ Tally lamp
When the picture of the camera paired with this unit is chosen by the special-effects generator (SEG-2000AP/APM, etc.), this lamp and camera's tally lamp light up to indicate recording.
The tally lamp also lights up when the CALL button of this unit is pressed.

❸ LOCK switch
After all the necessary adjustments on this unit are complete, set this switch to ON to have the settings held. The adjustments will not change even if the controls are moved by mistake.
Always set this switch to OFF after turning off the unit.

❹ CALL button
Press to call the camera operator. The tally lamp of the viewfinder connected to the camera and the tally lamp of this unit light up while this button is pressed.

❺ INTERCOM jack (mini intercom jack) **and level control**
Connect a headset, such as the Sony DR-100, to this jack to communicate among the camera, camera control unit and control console. The sound volume at the headset can be adjusted by turning the level control with a small screwdriver.

❻ SC PHASE (subcarrier phase) selector and control
To synchronize this unit and the connected camera with an external sync signal (gen-lock input), adjust the SC phase.
SC PHASE selector
To switch the SC phase by 180°, set the selector to the opposite position.
SC PHASE control
To adjust the SC phase continuously within 180°, turn this control.

❼ H PHASE (horizontal phase) control
To synchronize this unit and connected camera with an external sync signal (gen-lock input), adjust the H phase by turning this control.

❽ AUTO CENT (automatic centering) switch and indicator
For the automatic centering adjustment, point the camera at an appropriate object and press this switch down. (The switch automatically returns to its original position when released.)
The indicator lights up when the centering is adjusted and will go off after about 5 seconds. If the centering cannot be adjusted, the indicator will blink. For details, refer to page 14.

❾ MODE selector
Select the output signal of the CCU-M3P/PM.
BARS: The color bar signal will be output from the VIDEO OUT and R, B, G connectors.
CAMERA: The signal picked up by the camera will be output from the VIDEO OUT and R, B, G connectors.

❿ GAIN selector
Generally set this selector to "0dB". When the selector is set to "9 dB" or "18 dB", the video output level will be raised by 9 dB or 18 dB, respectively.

⓫ W/B BALANCE adjustment switches and indicators
PRESET/AUTO/MANUAL selector
PRESET: The white balance is adjusted at the factory to 3200°K with the color temperature filter selector set to "1", the color temperature of an iodine lamp. Use this position when you have no time to adjust the balance.
AUTO: For automatic white and black balance adjustment using the BLACK and WHITE switches. The adjusted value is memorized in the camera.
MANUAL: For manual white and black balance adjustment using the MANUAL GAIN and MANUAL PED controls.

BLACK switch and indicator
To adjust the black balance automatically, press this switch down with the PRESET/AUTO/MANUAL selector set to AUTO or PRESET.
The indicator will light up for about 5 seconds after the black balance adjustment is complete.

WHITE switch and lamp
To adjust the white balance automatically, press this switch down with the PRESET/AUTO/MANUAL selector set to AUTO.
The indicator will light up for about 5 seconds after the white balance adjustment is complete. The indicator will blink if the white balance cannot be adjusted for some reason. For details, refer to page 12.

MANUAL PED (pedestal) controls
Adjust the red and blue pedestal levels separately with these controls when the PRESET/AUTO/MANUAL selector is set to MANUAL.

MANUAL GAIN controls
Adjust the red and blue gains separately with these controls when the PRESET/AUTO/MANUAL selector is set to MANUAL.

⓬ MANUAL IRIS control
For manual iris adjustment, turn this control with the MANUAL/AUTO selector set to MANUAL. Adjustment can be made from open to closed.
During the auto iris mode, the iris can be adjusted slightly by turning this control.

⓭ MANUAL/AUTO IRIS adjustment selector
MANUAL: The iris can be manually adjusted with the IRIS control.
AUTO: The iris will be automatically adjusted depending on the brightness of the subject.

⓮ MASTER PEDESTAL control
Turn this control to adjust the master pedestal level.

CONNECTOR PANEL

❶ RETURN VIDEO connectors (BNC type) **and 75Ω termination switch**
IN connector
Connect to the video output from a control console or a VTR to feed the return video signal to the camera viewfinder.
The return video signal to be fed must be synchronized with the video input signal from the camera.

OUT connector
The return video input signal to the IN connector is directly output from this connector (a loop-through configuration).
To supply the return video signal to another video unit, connect this connector to the return video input connector of the unit.

75Ω termination switch
When only the RETURN VIDEO IN connector is used, set this switch to ON.
When both the RETURN VIDEO IN and OUT connectors are used (a loop-through configuration), set this switch to OFF.

❷ GEN LOCK connectors (BNC type) **and 75Ω termination switch**
IN connector
Connect a black burst or VBS signal for reference to synchronize the camera with an external sync signal.
When a reference signal is not connected, the camera is automatically switched to the internal sync mode.

OUT connector
The reference input signal to the IN connector is directly output from this connector (a loop-through configuration).
To supply the reference signal to another video unit, connect it to the gen-lock input connector of the unit.

75Ω termination switch
When only the GEN LOCK IN connector is used, set this switch to ON.
When both the GEN LOCK IN and OUT connectors are used (a loop-througth configuration), set this switch to OFF.

❸ VIDEO OUT connectors (BNC type) **and VBS/VB selector**
VBS/VB connector and VBS/VB selector
Either the VBS (video, burst, sync) or the VB (video, burst) signal is output from this connector. The signal to be output will be selected by the VBS/VB selector.
Connect to a video input connector of video equipment such as a VTR, special-effects generator, chroma keyer, etc.

VBS connector
A VBS signal is output from this connector. Connect to a video input connector of video equipment such as a VTR, special-effects generator, chroma keyer, etc.

❹ R, B, G connectors (BNC type)
R, B and G video signals from the camera are output from these connectors. Connect to the R, B and G input connectors of a monitor or a chroma keyer.

❺ TALLY/INTERCOM connector (DIN 4 pin)
Connect to the tally/intercom connector of a control console, chroma keyer, special-effects generator, etc.

❻ DC IN connector (DIN 4 pin)
Connect an ac power adaptor CMA-7CE here. For details, see page 7.

❼ SYNC OUT connector (BNC type)
The sync signal from the camera (negative, 4V p-p) is output from this connector. Connect to the sync input connector of the RGB monitor.

❽ VF (viewfinder) connector (8 pin)
By connecting an optional viewfinder, such as the DXF-40CE or PVM-4000P, to this connector, it is possible to monitor the camera picture.

❾ CAMERA connector (14 pin)
Connect to the VTR/CCU/CMA connector of the DXC-M3 series camera.

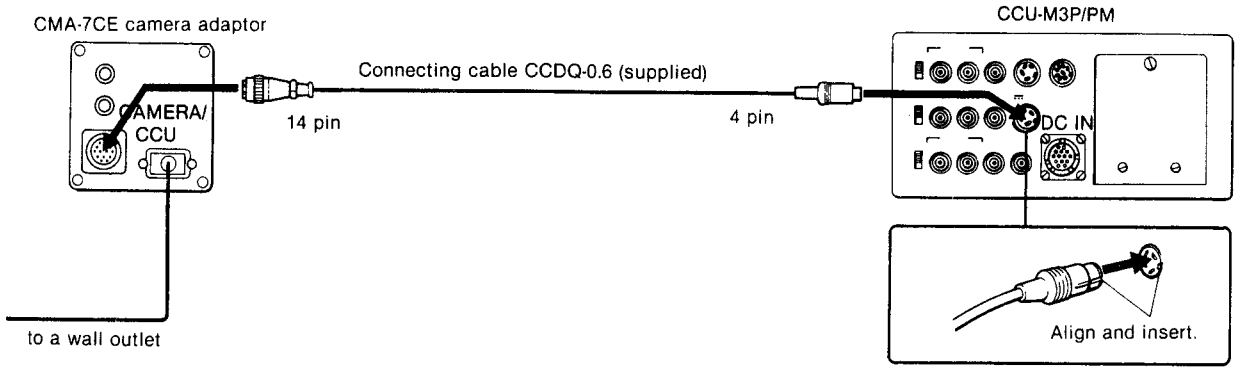
❿ Battery pack compartment
Install a BP-60 battery pack (optional) to operate the unit on dc power.

1-4. POWER SOURCES

When connecting cables, set the POWER switch to OFF.

This camera control unit (CCU) can be powered from two different sources: ac adaptor and battery pack.

AC ADAPTOR

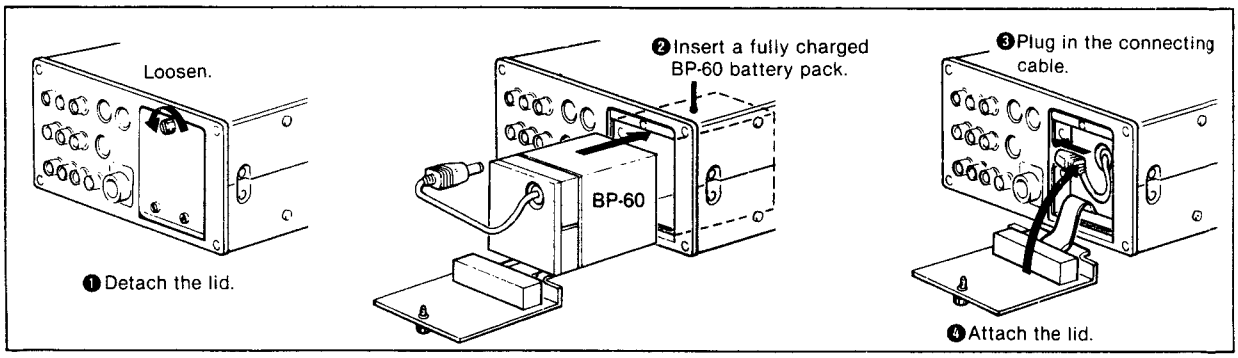


When the ac camera adaptor is connected to the DC IN jack, the internal battery (if present) is automatically disconnected.

Both the camera and the CCU are operated by ac power when the battery adaptor of the camera is detached.

BATTERY PACK

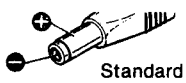
Use the BP-60 battery pack (optional) when recording outdoors.
Always operate the camera with its own battery pack when operating the CCU on battery.
If the camera is not powered by its own power source, the camera will not function correctly.



Battery life
A fully charged battery will allow the CCU to operate continuously for about 5 hours at a normal temperature.

Battery alarm
- When the CCU is operated with the battery pack, the green pilot lamp blinks several minutes when the voltage of the battery pack falls below its rated value to warn that the battery must be replaced. If the battery is used further, the CCU will automatically shut down and the lamp will go off.
- When the pilot lamp starts blinking, the controls on the front panel cannot be adjusted. Replace the battery with a fully charged one.
- The battery alarm can also be seen in camera's viewfinder.

Do not use any battery pack other than Sony's product. Polarity of the battery plug may differ with the manufacturers.

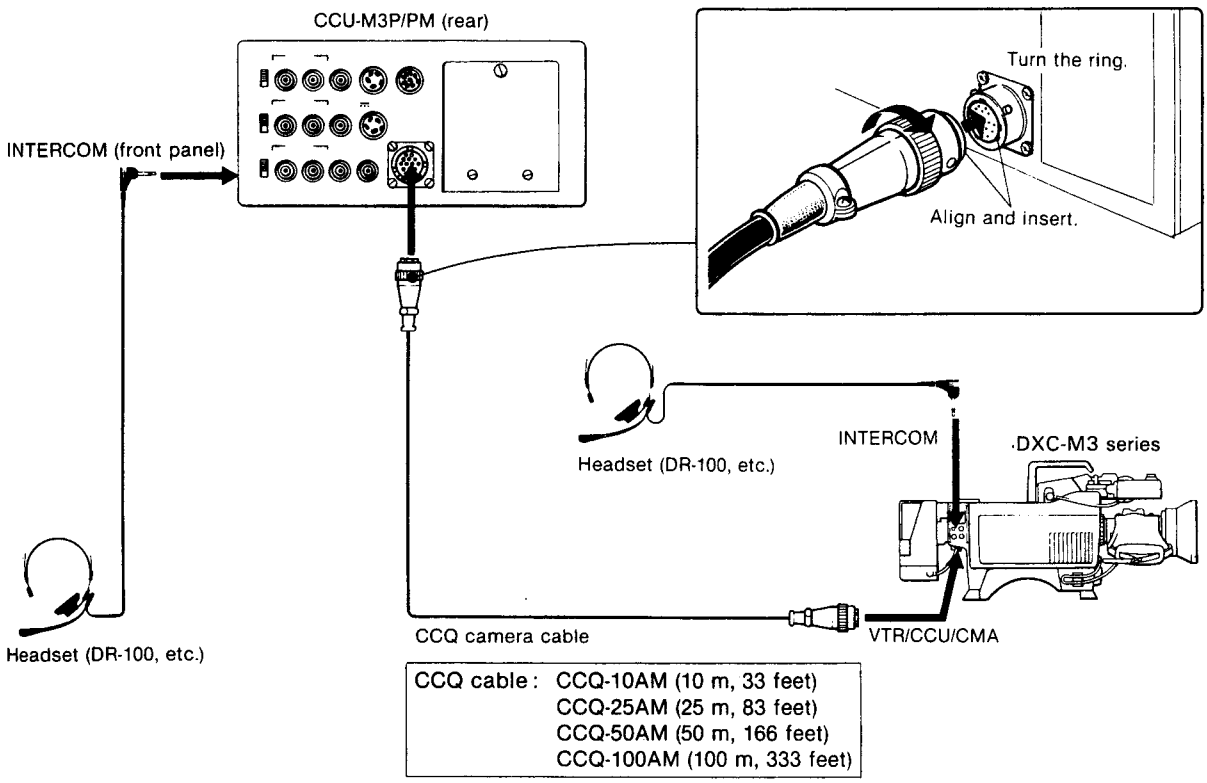


Standard polarity of Sony battery pack

1-5. CONNECTION EXAMPLES

When connecting cables, set the POWER switch to OFF.

CAMERA CONNECTION

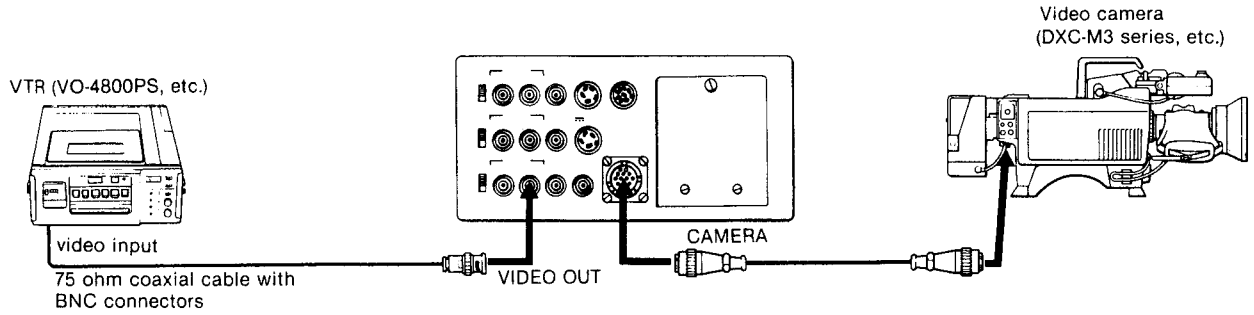


CCQ cable :	CCQ-10AM (10 m, 33 feet)
	CCQ-25AM (25 m, 83 feet)
	CCQ-50AM (50 m, 166 feet)
	CCQ-100AM (100 m, 333 feet)

Notes on the camera cable length
The camera cable can be extended up to 100 m (333 feet) except in the case mentioned below.
●If the PVM-4000P color video monitor is connected to the DXC-M3P/PM, the length of the camera cable is a maximum of 50 m (166 feet).

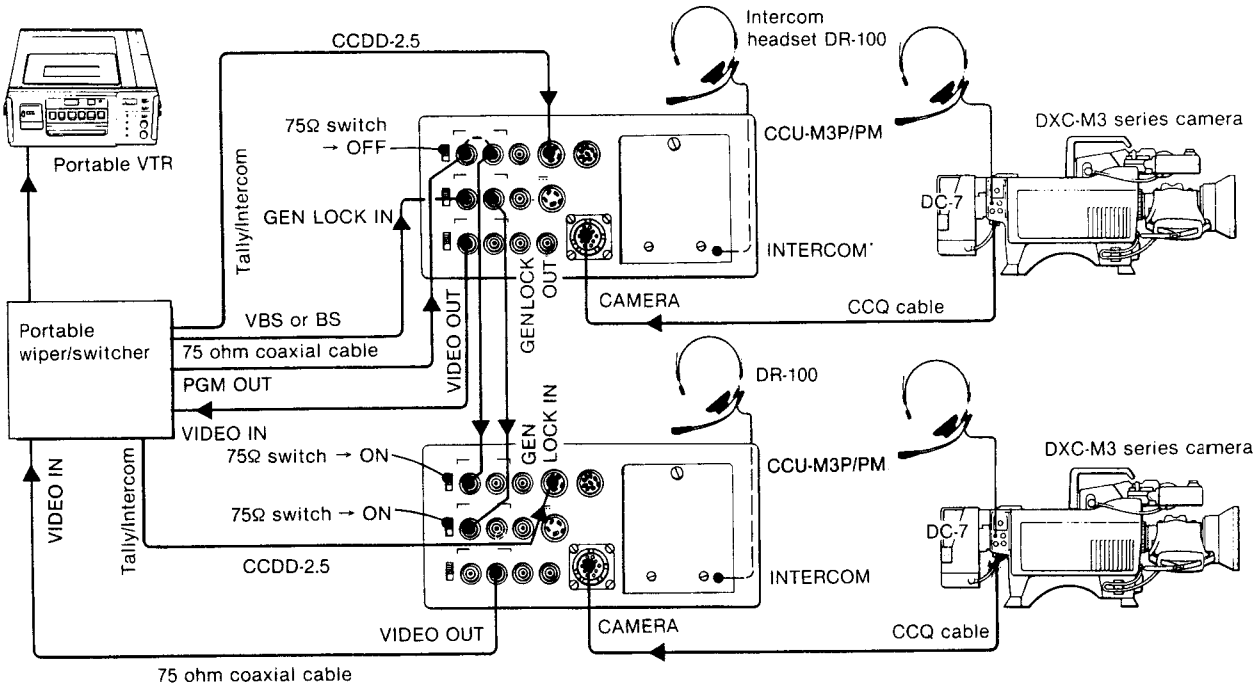
CONNECTION EXAMPLES

Using a single camera



Using two or more cameras

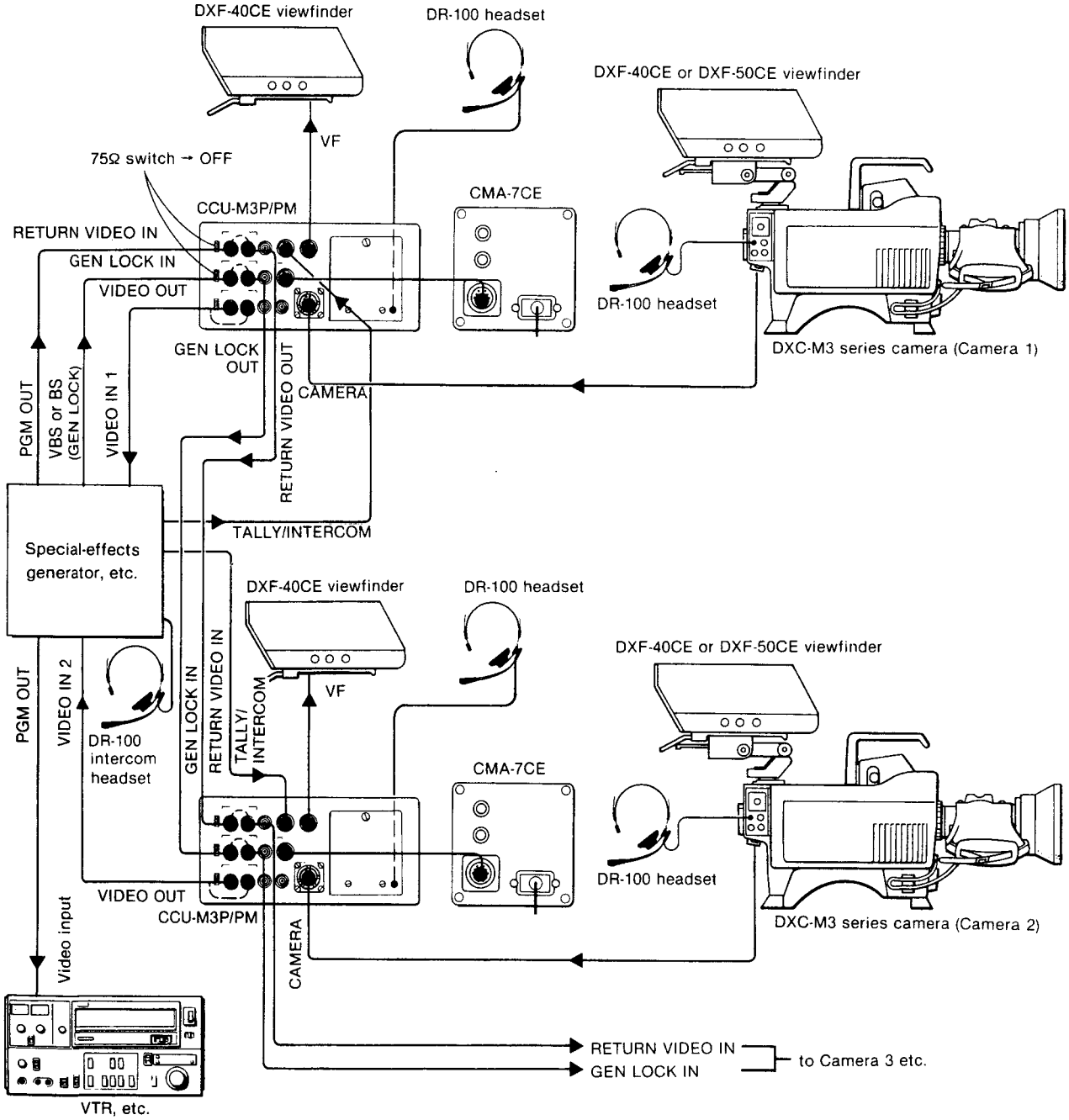
Using a switcher :



Using a special effects generator:

The diagram below shows a system using two DXC-M3 series cameras, two CCU-M3P/PM camera control units and an SEG-2000AP/APM special-effects generator. In this configuration, special effects, such as switching, mixing, wiping, keying and color matting, can be performed.

Besides these effects, by connecting a CRK-2000P/PM universal chroma keyer and/or the WEX-2000P/PM wipe pattern extender, you can obtain a wider variety of special effects.



Notes when using the PVM-4000P color video monitor

- When the PVM-4000P color video monitor is to be connected to the CCU-M3P/PM, we recommend operating the PVM-4000P by its own power source because it requires a great deal of power. When operating the PVM-4000P by its own power source, connect the VIDEO OUT connector of the CCU-M3P/PM to the VIDEO IN connector of the PVM-4000P to monitor the video signal.
- If the PVM-4000P color video monitor is connected to the VF connector of the CCU-M3P/PM, only the viewfinder supplied to the DXC-M3 series camera (1.5-inch, monocrhrome) can be connected to the DXC-M3 series camera.
- If the PVM-4000P color video monitor is connected to the DXC-M3 series camera, the length of the camera cable is a maximum of 50 m (166 feet).

Notes on connections for gen-lock and return video

When using two or more cameras, connections should be made so that all the cameras will lock to the same reference signal (i.e. the GEN LOCK OUT connector of a CCU should be connected to the GEN LOCK IN connector of another CCU) as is shown in the diagram on the previous page.
The return video signal from a control console or a VTR can be supplied to each camera viewfinder by connecting the CCU's RETURN VIDEO IN and OUT connectors in the same way.

- Be sure to set each 75Ω termination switch to OFF when the loop-through input and output of the GEN LOCK or RETURN VIDEO connectors are used. Set them to ON when only the input connector is used.

1-6. OPERATIONS

OPERATIONAL SEQUENCE

For details on each adjustment, please refer to the corresponding item.

Make sure that the LOCK switch of the CCU-M3P/PM is set to OFF.

↓

Turn on the CCU-M3P/PM and the connected equipment.
After the power is turned on, wait for several seconds until the camera is controllable by the CCU-M3P/PM.

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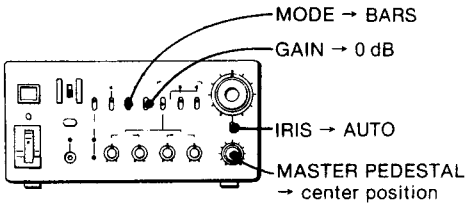
Set the switches and controls of the CCU-M3P/PM as illustrated below.



When only one camera is used → ↓

When two or more cameras are used → Adjust the H and SC phases of all cameras. ↓

Adjust the color of the monitor using color bar signals supplied from the camera.

↓

Set the MODE selector to CAMERA.

↓

Set the FILTER selector of the DXC-M3 series camera to the appropriate position.

↓

Adjust the white and black balance.

↓

If necessary, you can adjust the gain, iris, master pedestal level and centering.

↓

Start shooting.
During shooting, you can communicate with the camera operator or see the program output signal from the SEG, VTR, etc.

Which setting takes precedence, the one made by the camera or by the CCU?

When the CCU-M3P/PM is connected to the camera, all the settings adjustable by the CCU-M3P/PM, except for centering and white/black balance adjustments, can be made on the CCU-M3P/PM regardless of the settings of the switches on the camera.

- For the centering adjustment, when the AUTO CENT switch of the camera is set to PRESET, centering cannot be adjusted automatically on the CCU-M3P/PM.

When the AUTO CENT switch of the camera is set to the position other than PRESET, the last setting made by either the CCU or the camera takes precedence.

- For the white balance adjstment, when the W/B BALANCE selector of the CCU-M3P/PM is set to AUTO or MANUAL, the last setting made by either the CCU or the camera takes precedence. When the W/B BALANCE selector of the CCU-M3P/PM is set to PRESET, the camera operates on the preset white balance value.
- For the black balance adjustment, the last setting made by either the CCU or the camera takes precedence regardless of the settings on the other unit.

WHITE BALANCE AND BLACK BALANCE ADJUSTMENTS

The white balance and black balance should be correctly adjusted for lifelike color reproduction and a clear picture. The adjustment should be made under the same lighting conditions as those under which the recording will be made.

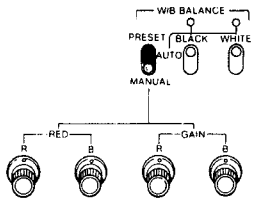
Automatic adjustment

1 Set the FILTER selector of the camera to the position corresponding to the lighting conditions.
2 Point the camera at a white subject (white pattern, white wall, etc.) and zoom up on it. (Refer to the instruction manual of the camera).
3 Set the W/B BALANCE PRESET/AUTO/MANUAL selector of the CCU-M3P/PM to AUTO.
4 Press the BLACK switch down. The switch automatically returns to its original position when it is released.
The lamp above the BLACK switch lights for about 5 seconds when the black balance is adjusted.
  - If the lamp does not light after about ten seconds, press the BLACK switch again.
5 Press the WHITE switch down. The switch automatically returns to its original position when it is released.
The lamp above the WHITE switch lights for about 5 seconds when the white balance is adjusted.
  - If the lamp does not light after about ten seconds, press the WHITE switch down again.
  - If the lamp blinks, check the camera viewfinder screen to find out the cause and change the FILTER selector position of the camera, then try the white balance adjustment again.

NOTE:
When the lighting condition of the object is changed, adjust the white balance only. Readjustment of the black balance is not required.

Manual adjustment
For fine adjustment of the white balance and the black balance, we recommend manual adjustment.

1 Set the FILTER selector of the camera to the position corresponding to the lighting conditions.
2 Set the W/B BALANCE PRESET/AUTO/MANUAL selector of the CCU-M3P/PM to MANUAL.



3 Point the camera at a black subject, or, if a waveform monitor is used, close the iris by setting the IRIS selector to MANUAL and turning the IRIS control fully counterclockwise.
4 Turn the MANUAL PED R and B controls to adjust the black balance so that the black part of the picture on the color monitor screen becomes black. If a waveform monitor is used, turn the controls by checking the waveform.
5 Point the camera at a white subject (white pattern, white wall, etc.) and zoom up on it. (Refer to the instruction manual of the camera).
6 Turn the MANUAL GAIN R and B controls to adjust the white balance so that the white subject on the color monitor screen is pure white. If a waveform monitor is used, turn the controls by checking the waveform.

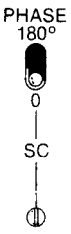
Painting
Using the MANUAL GAIN and MANUAL PED controls, a picture can be colored to obtain a special effect. For example, a picture can be made reddish to indicate sunset or bluish to show early morning. This is called "painting".
Monitoring the picture on the color monitor screen, turn the MANUAL GAIN and MANUAL PED controls so that the desired color is obtained.

If you want to start recording without adjusting the white balance and the black balance
Set the FILTER selector of the camera to the appropriate position, and set the W/B BALANCE PRESET/AUTO/MANUAL selector to PRESET.
An approximate balance will be obtained.

H AND SC PHASES ADJUSTMENT

When two or more cameras are used, supply the same reference signal to all cameras and adjust each camera so that the picture tone of all cameras will be the same.

If the phase check indication is available
If CCU-M3P/PM camera control units are connected to a special-effects generator such as the SEG-2000AP/APM or SEG-2000P/PM, or the CRK-2000P/PM universal chroma keyer, the phase check indication is available.
1 Turn on the PHASE INDICATION switch of the connected special-effects generator or the chroma keyer.
2 Adjust the horizontal phase by turning the H PHASE control screw of the CCU-M3P/PM.
3 Adjust the subcarrier phase by using the SC PHASE 180°/0° selector and the SC PHASE control screw of the CCU-M3P/PM.



For details on how to adjust the SC phase and H phase, refer to the instruction manual of the connected special-effects generator or the chroma keyer.

If the phase check indication is not available
Use a waveform monitor or an oscilloscope for the H phase adjustment and a vectorscope for the SC phase adjustment. To adjust the cameras, pick one camera as the reference camera and adjust all other cameras to it. For example, if Camera 1 is picked as the reference camera, first precisely adjust Camera 1 to obtain the best possible picture, and then adjust the picture of Camera 2 to Camera 1, the picture of Camera 3 to Camera 1, and so on.
When adjusting the SC phase, it is convenient to display the color bars of the pair of cameras to be adjusted on a monitor at the same time using a wiper or a special-effects generator.
For details, refer to the instruction manual of the connected wiper or special-effects generator.

VIDEO MONITOR ADJUSTMENT

When a color video monitor is used for montoring a picture, adjust the color of the monitor using color bar signals supplied from the camera.
1 Set the MODE selector on the CCU to BARS. Color bar signals are displayed on the monitor screen.
2 Adjust the color and hue controls on the monitor while viewing the color bars on the screen.
3 Set the MODE selector to CAMERA after the adjustment is finished.

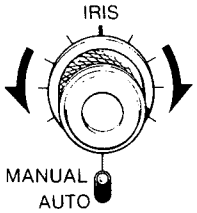
VIDEO OUTPUT LEVEL ADJUSTMENT

If a clear picture cannot be obtained because of insufficient lighting, raise the video output level using the GAIN selector.
At the 9 dB position, the level is raised by 9 dB and at the 18 dB position, the level is raised by 18 dB.
Normally set the switch to 0 dB.

IRIS ADJUSTMENT

Automatic adjustment
Set the IRIS MANUAL/AUTO selector to AUTO and the iris will be automatically adjusted to the brightness of the subject.
You can precisely adjust the iris in the automatic iris mode by turning the IRIS control.

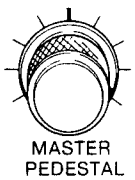
Manual adjustment
Set the IRIS MANUAL/AUTO selector to MANUAL and turn the IRIS control to adjust the iris manually.



Manual adjustment may be more effective when recording an object against a bright sky or a scene with high contrast.

MASTER PEDESTAL LEVEL ADJUSTMENT

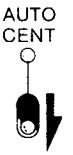
The MASTER PEDESTAL control adjusts the pedestal level of the camera picture. Normally set this control to the center position. When the pedestal level adjustment is required, use the waveform monitor for best result. If the waveform monitor is not available, display the color bar on the monitor and adjust the MASTER PEDESTAL control so that the black and white bars are seen as they are.



CENTERING ADJUSTMENT

The centering of the R, B and G pickup tubes has been adjusted at the factory, so normally no readjustment will be necessary. If the centering adjustment is required, however, adjust the white balance first, then proceed as follows.

1 Set the AUTO CENT switch on the camera to a position other than PRESET.
2 Set the MANUAL/AUTO IRIS selector of the CCU to AUTO.
3 Shoot the chart supplied with the camera or a test object. For details, refer to the instruction manual of the camera.
4 Press the AUTO CENT switch down. The switch automatically returns to its original position when it is released.

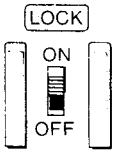


The lamp above the AUTO CENT switch lights for about 5 seconds when the centering is adjusted.

If the lamp blinks
The centering cannot be adjusted because
— the object does not have enough edges and contrast.
— the iris setting is not correct.
— the object is out of focus.
— the object has moved during the adjustment.
Check the above items and try the centering adjustment again.

LOCK FUNCTION

If the LOCK switch is set to ON after all the controls have been adjusted, the adjustment of the controls are held so that even if a control is moved by mistake, the adjustment is not changed. To readjust the controls on the CCU-M3P/PM, set the LOCK switch to OFF.



Note
Set the LOCK switch to OFF after the camera shooting is finished.
If you turn on the CCU-M3P/PM with the LOCK switch set to ON, the camera will not accept any commands from the CCU and the settings on the camera will apply. To apply the CCU setting, set the LOCK switch to OFF.

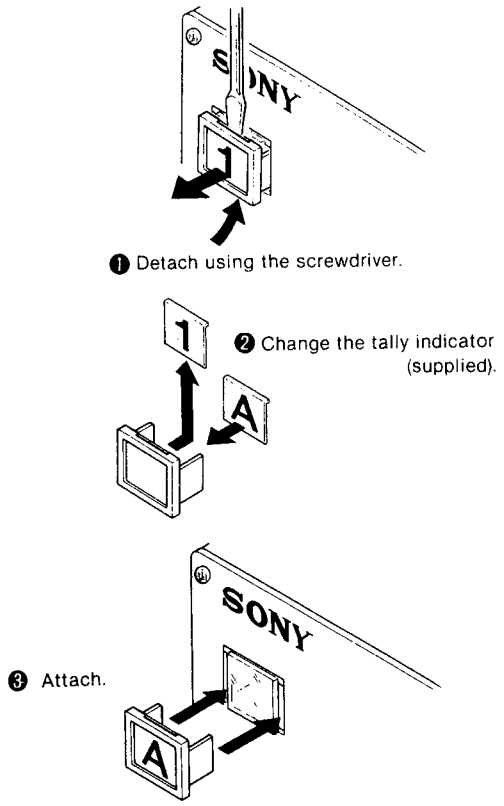
COMMUNICATION WITH A CAMERA OPERATOR OR WITH A CONTROL CONSOLE

When a DR-100 intercom headset (optional) is connected to the INTERCOM jack on the front panel, communication between the CCU and the camera is possible. If the TALLY/INTERCOM connector on the rear panel is connected to a control console, special-effects generator, etc., communication with this equipment is also possible.
To notify the camera operator that the CCU operator wants to talk with him, press the CALL button on the CCU. The REC/TALLY indicator in the viewfinder of the camera will light.
To adjust the volume of the sound at the headset, turn the INTERCOM volume control screw.

TALLY LAMP

The tally lamp will light when the camera connected to the CCU is selected on the control console or the special-effects generator, or when the CALL button of the CCU is pressed to call the camera operator.
The indication on the tally lamp can be changed by changing the tally lamp indication segments (supplied) as illustrated below.

Changing the tally lamp indication



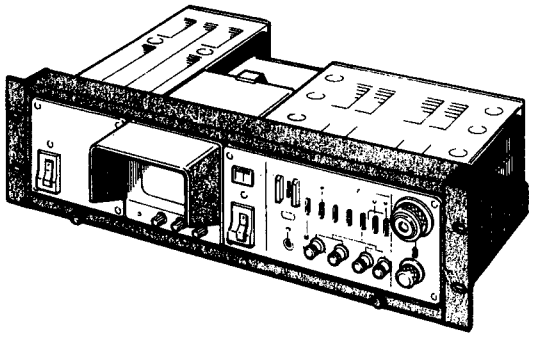
RETURN VIDEO

When the START/RETURN VIDEO switch of the camera is pressed with the VF VIDEO selector of the camera set to AUTO, the return video signal (the signal from the VTR in the record mode or the signal selected on the control console) can be seen on the viewfinder screen.
For details, refer to the instruction manual of the camera.

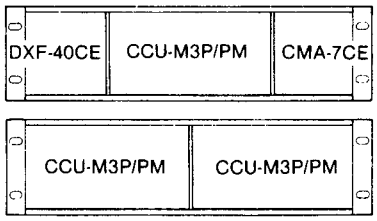
- Return video monitoring is possible on the camera's viewfinder, but is not possible on a viewfinder connected to the CCU.

RACK MOUNT

By using the RMM-1800 rack-mounting brackets, it is possible to install a CCU-M3P/PM, DXF-40CE viewfinder and CMA-7CE camera adaptor into a standard 19-inch rack for a well-organized studio system.



mounting examples



1-7. REPACKING FOR SHIPMENT

The repacking procedure is subject to change. Refer to the packing instructions on the original carton as well as those shown here.